REMARKS/ARGUMENTS

Claims 1-29, 39-67 and 77 remain in this application. Claims 30-38 and 68-76, previously withdrawn, have been canceled.

In view of the examiner's earlier restriction requirement, applicant retains the right to present claims 30-38 and 68-76 in a divisional application.

In view of the cancellation of independent claims 30 and 68, claims 3 and 18, previously indicated as containing allowable subject matter, have been amended to be in independent form. Minor typographical errors in other claims have also been corrected where found.

Art rejection US 3,652,440 (hereinafter "Dehner")

To the extent that the rejection over Dehner might be maintained against amended claim 1, reconsideration is requested because nothing in Dehner suggests that the duration of the measuring period be independent of the spectral composition of other voltages.

The claimed invention is a method of controlling an electrochemical machining process, in which the spectral composition of the voltage induced by the machining current is analyzed for a period of time which has been predetermined to be sufficient to determine if control parameters should be changed. This was the meaning of claim 1 as filed. In view of the rejection, which implies that "predetermined period" is construed to mean "while some predetermined other condition exists" (e.g., not too much noise appears in the power supply output), claim 1 has been amended to avoid such construction. The end of the claim limitation period of time is independent of some other spectral composition occurrence.

Applicants have taught that the duration of the period should be selected in a way which omits the less informative parts of the measured voltage (page 12, lines 27-29; page 13, lines 16-17).

Dehner teaches an electrochemical machining apparatus which is intended to distinguish between the occurrence of a spark and other high frequency voltages across the machining gap, and shuts down machining only when a spark has occurred. The required sensitivity of the sensing system is independent of both the voltage and current at the machining gap (col. 1, lines 18-31).

Dehner's summary states that it distinguishes between a spark and other noise by sensing

all signals across the gap in a predetermined frequency range and selecting from the sensed signals a high frequency voltage which appears only across the gap (col. 1, lines 66-69). However, what really occurs is that this sensed signal is blocked or ignored whenever there is a signal in this same frequency range passing through or being produced by the power supply. Thus if power supply noise in the filter bandpass range is present while a spark occurs, the spark will not be detected because the analysis has been temporarily stopped.

More particularly, Dehner teaches that a filter 10 receives transient noise signals which exist on the lines of the AC power source 16 (col. 2, lines 68-75), and a filter 17 receives signals corresponding to the voltage across the machining gap. The filters 10 and 17 have substantially the same frequency range, "which is essentially the same frequency range as that of voltages produced by sparks at the machining gap" (col. 2, lines 17-19). This frequency range excludes rectifier ripple noise or silicon controlled rectifier noise, both of which rectifier noises are in frequency ranges different from the spark frequencies.

Dehner teaches that whenever there is an output from the pulse shaping and timing network 12 (resulting from a sufficient output from filter 10) a comparator 14 prevents signals from reaching flip-flop circuit 15 which turns off machining (col. 2, lines 24-27). Thus the signals from the filter 17 are blocked from reaching the pulse shaping and timing network 19 even though a spark may have occurred if the spark occurs simultaneously with, or just after, noise causes an output from filter 10.

This is explained more completely in column 3. The detailed explanations of processing of signals from the filter 10 shows that avoidance of unnecessary stoppage of machining is most important. Only if a spark signal exists long enough, with no noise signal from filter 10. will the flip-flop 15 cause a change in the machining process. The timing chart of Fig. 5 shows that power line noise signal, whether its processing starts before, with or a little later than the gap current signal, takes logical priority over the gap current signal (col. 7, line 47 through col. 8, line 18). Furthermore, the only change that Dehner can cause in the machining process is to stop it (col. 6, lines 73-75).

Once the machining is stopped, it does not resume automatically (col. 7, lines 12-22; col. 8, lines 44-54).

Therefore it is clear that Dehner teaches that the voltage induced by the machining current

is analyzed continuously for the presence of signals within the filter bandpass, but the filter output is blocked from reaching the adapting circuit 15 whenever another voltage (the power supply output) contains signals within that same bandpass range. This is not analysis for a predetermined period of time. It is analysis that continues until some unrelated condition occurs.

Accordingly Dehner does not teach nor suggest the invention of claim 1.

With respect to claim 9, applicants submit that Dehner does not teach a predetermined period of time.

With respect to claim 28, applicants request reconsideration, and respectfully traverse the allegation that Dehner teaches applying the electric current in pulses. The pulse shaping and timing networks of Fig. 1 serve to adjust the timing of application of the voltage signals to the comparator 14. This process is described in extreme detail at col. 3, line 16 to col. 4, line 62, and col. 5, line 7 to col. 6, line 46. This control logic is unrelated to a pulsed operation of the tool current. The DC tool current (col. 2, lines 29-30; col. 7, lines 1-22) continues from onset of machining until a spark occurs and the current is shut off, or the operator causes machining to stop. After a spark, the operator must push the button 109 to the open (off) position, and then to the closed (on) position.

Art rejection - Dehner and US 4,734,176 (hereinafter "Zemba")

To the extent that the rejection over Dehner in view of Zemba might be maintained against claim 1s 14 and 16, reconsideration is requested because nothing in Dehner suggests applying current in pulses, and the water purification system of Zemba is a remote field of technology which would teach little to one working in the electrochemical machining art.

Zemba teaches that polarity reversal occurs after a prescribed time interval such as 256 seconds (approximately 4 minutes) and then continues for an identical period of time (col. 5, lines 14-17). If this teaching were combined into an ECM machine, the electrode would be rapidly destroyed.

Zemba also teaches pulse width modulation of the ionization current (col. 1, lines 62-66), but this does not suggest pulsing of the machining current because the electrochemical processes being performed are totally different, and the problems being overcome are totally different..

Art rejection – Dehner, Zemba and US 6,214,200 (hereinafter "Altena")

To the extent that the rejection over Dehner might be maintained against claim 17, reconsideration is requested because nothing in Dehner, Zemba or Altena suggests the combination of determining information for a predetermined measuring period claimed herein.

Maarten Brussee, the first named inventor in the instant application, is the second named inventor in Altena. Both foreign priority applications were assigned to Koninklijke Philips Electronics N.V., and the corresponding U.S. patent applications were assigned to U.S. Philips Corp., a wholly owned subsidiary of the Netherlands corporation. Thus because they are and at all times have been commonly owned, applicants request withdrawal of the rejection.

Art rejection – Dehner and US 5,820,744 (hereinafter "Edwards")

To the extent that the rejection over Dehner in view of Edwards might be maintained against claim 26, reconsideration is requested for the reasons given above with respect to Dehner, and because nothing in Edwards suggests that a spectral analysis, of the voltage induced due to machining current, be used to control electrolyte pressure.

Aplicants appreciate the indication of allowable subject matter in various claims, and allowance of claims 39-67 and 77.

In view of the showing of patentability of the rejected claims, applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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